handling of this type of case. It seemed that it might be worthwhile to do this, even though we know at the very beginning that most of the information is going to be of negative nature. The subject at the present time is quite popular and is causing considerable discussion. Therefore, at the best it seems that all we can offer at the present time is that one might become suspicious of equine encephalitis when the onset is unusually abrupt, accompanied by severe headache, and especially when there is a generalized spasticity of the muscles of the extremities. All of the proved cases that have occurred in the region of the San Joaquin Valley have been well up until the onset of this illness. It did not seem to come on gradually. The course of the disease seems to be comparatively short and the mortality rate seems to be reasonably high. To date there has been no proved vector, and there has been no proved case which was transmitted directly from the horse to the human being, and so far the likelihood of cross-infection among members of the families seems to be remote. Therapeutically, nothing has been offered.

I should like to express my appreciation to Beatrice Howitt of the Hooper Foundation for the kind way in which she supplied the reports of the neutralization tests to me. It was through her reports and the records of the Fresno General Hospital that data for this paper were obtained.

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REFERENCES

1. Howitt, B.: Viruses of Equine and of St. Louis Encephalitis in Relationship to Human Infections in California, 1937-1938, Am. J. Pub. Health, 29:1083-1097 (Oct.), 1939.

2. Howitt, B.: Equine Encephalomyelitis: Its Relationship to Man in California, Calif. and West. Med., 51:317-319 (Nov.), 1939.

3. Myer, K. F., Haring, C. M., and Howitt, B. F.: Science, 74:227, 1931.

4. Merrill, M. H., and TenBroeck, C.: Transmission of Equine Encephalomyelitis Virus by Aëdes Ægypti, J. Exper. Med., 62:687-695 (Nov.), 1935.

5. Murphy, J. Harry: Personal communication.

6. Murphy, J. H.: Comparative Epidemiology of Encephalomyelitis and Poliomyelitis, Nebraska M. J., 24:453-457 (Dec.), 1939.

7. Fothergill, L. D., Holden, M., and Wyckoff, R. W. G.: Western Equine Encephalomyelitis in Laboratory Worker, J. A. M. A., 113:206-207 (July 15), 1939.

8. Larimer, R. N., and Wiesser, E. G.: Human Equine Encephalomyelitis, J. Iowa M. Soc., 29:287-289 (July), 1939.

9. Wesselhoeft, C., Smith, E. C., and Branch, C. F.: Human Encephalitis: Eight Fatal Cases, with Four Due to Virus of Equine Encephalomyelitis, J. A. M. A., 111: 1735-1741 (Nov. 5), 1938.

10. Fothergill, L. D., Dingle, J. H., Farber, S., and Connerley, M. L.: Human Encephalitis Caused by Virus of Eastern Variety of Equine Encephalomyelitis, New England J. Med., 219:411 (Sept. 22), 1938.

11. Muckenfuss, R. S., Armstrong, C., and Webster, L. T.: Etiology of 1933 Epidemic of Encephalitis, J. A. M. A., 103:731-733 (Sept. 8), 1934.

12. Webster, L. T., and Wright, F. H.: Recovery of Eastern Equine Encephalomyelitis Virus from Brain Tissue of Human Cases of Encephalitis in Massachusetts, Science, 86:305-306 (Sept. 30), 1938.

ALLERGIC ECZEMA OF INFANCY AND CHILDHOOD: APPLICATION OF SKIN TESTING*

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"SKIN TESTING" may be defined as "a search for the identity of proteins causing clinical symptoms in a disease resulting from a sensitivity to those proteins." By the same token, "allergic eczema" may be defined as "a skin manifestation of this protein sensitivity." Within these strict definitions it becomes possible to discuss the application of skin testing as a practical and valuable procedure.

As with any test, the reliability of skin testing depends, to a great extent, on adherence to proper principles and proper technique. These merit some discussion.

COMPLETE TESTING NECESSARY

The diet and the environment even of the newborn are infinitely complex. From the moment of birth, and even *in utero,* the infant is exposed to numerous proteins. The breast-fed infant, to the proteins in the mother's diet, the bottle-fed infant, to the proteins in its formula, to the wool of the blanket in which it is covered, to the face powder of the nurse who tends it, and to the pollen in the air at both hospital and home. As the infant grows older the diet and environment become more and more complex. It follows that success in the search for specific causes of allergic symptoms will be measured by the extensiveness of that search.

CARE IN THE TECHNIQUE OF TESTING

Each test protein must be carefully protected from contamination by other proteins; otherwise, false positive reactions will be frequent. Experiment shows that once a syringe has contained egg white, no amount of rinsing will make the syringe biologically clean unless the rinsing solution actually destroys the egg-white protein. The ordinary boiling of sterilization is ineffective. It is necessary between each test to clean glassware with acid-cleaning solution, and metal parts, such as needles, with strong alkali to actually destroy the contaminating proteins.

INTRADERMAL VERSUS SCRATCH TESTING

As will be brought out later, safety, accuracy and efficiency demand that every patient must first be tested by the scratch or puncture technique. Thereafter, the intradermal test may or may not be necessary.

APPARENT DISCREPANCIES IN THE RESULTS OF SKIN TESTING

All tests may be negative. Obviously, protein skin tests will not determine the cause of contact

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dermatitis, seborrheic eczema, or fungous infections. Completely negative skin reactions, therefore, call for a reconsideration of the original diagnosis, for in our experience only 5 per cent of 138 cases of allergic eczema have consistently given completely negative reactions. If, however, the diagnosis is certain, a retest at a later date is indicated, for often the completely negative test in a definitely allergic individual indicates a temporary anti-allergic state.

Completely negative skin tests may also result from testing a too restricted number of proteins.

All tests may be positive. This may be due to urticaria factitia, or to contamination of all the test sites, including the blank control, by one or more proteins to which the patient is highly sensitive.

Negative reactions may occur to proteins which are known to cause clinical symptoms. The use of inactive test proteins or an anti-allergic phase to a particular protein may explain this result.

Positive reactions may be of no clinical significance, despite the most careful technique. Since in a given patient these reactions are generally of a lesser degree than those that do have clinical significance, they will be discussed in relation to the interpretation of the skin test.

INDICATIONS FOR SKIN TESTING

A thorough and searching history may make the cause of symptoms so obvious that dietary and environmental control is readily accomplished without resorting to the skin test. For example, 286 cases of allergic eczema were seen in the out-patient department of the Los Angeles Children's Hospital. Of these only 70, or 24 per cent, were referred to the Allergy Clinic. Presumably, the greater proportion of the other 76 per cent were satisfactorily controlled without skin testing. With these we are not here concerned. The cases that justify the time and effort necessary for proper skin testing are the ones that are not satisfactorily controlled by ordinary clinical methods.

INTERPRETATION AND APPLICATION OF RESULTS

About 10 per cent of allergic patients show a three- or four-plus reaction by the scratch or puncture test, and such reactions are practically always infallible clues to the cause of symptoms. The negative, the one-plus, and the two-plus reactions, on checking by the intradermal test, give three- and four-plus reactions in about 66 per cent of patients.

On the assumption that every protein that gives a positive reaction is harmful, and that the larger the reaction the more likely is this to be true, there is a logical and practical method for the solution of the most complex case. Assuming, for the sake of simplicity, that we are dealing only with food protein sensitivity, then every positively reacting protein is removed from the diet for at least six months. At the end of this time, one offending protein is given in moderate amounts for a week. Provided symptoms do not recur or are not aggravated, another offending protein is added to the diet. Adding a protein to the diet for a week permits the detection of any accumulative action or of a breakdown in tolerance. By consistently follow- this practice new tolerances and sensitivities may be uncovered without undue delay or harm to the patient.

The object of this manipulation is primarily to determine the cause of symptoms; but of almost equal importance is the fact that it can be done without dangerous dislocation of nutritional needs and without too great a strain on domestic efficiency and maternal tranquillity. These are important, for if they are disturbed, coöperation becomes poor, and in a chronic ailment such as allergic eczema prolonged coöperation of the parent is essential for success.

Allergic eczema is often the result of sensitization not only to foods, but to other substances such as pollens, hairs, feathers, orris root, and similar sources of protein. If this is forgotten, then the most careful dietary manipulation, whether based on skin tests or trial and error, will be fruitless. Thus in sixty cases of allergic eczema in which one could be definitely certain of the etiology, although 40 per cent were caused by foods alone, there were 20 per cent caused by pollens alone, 11 per cent by epidermals alone, and in the remaining 29 per cent, foods, pollens and epidermals in various combinations shared equally in importance as the cause of symptoms. This again emphasizes the necessity for complete and exhaustive testing.

From the results of skin testing, one may choose safe substitutes in arranging new diets. For example, if cow's milk causes eczema, the skin test will determine whether goat's milk or a soy-bean preparation may take its place without subjecting the patient to the risk of diet trial. In the same way, as it becomes necessary to enlarge the scope of a child's diet or environment, one may by means of the skin test learn beforehand what is to be avoided.

THE VALUE OF SKIN TESTING

The allergic infant or child, regardless of the method of treatment, generally becomes well of his eczema, but later develops respiratory symptoms. Extensive lichenification and thickening of the skin, fungous infections, pyoderma, contact dermatitis, dermatitis medicamentosa, etc., often retard healing, complicate treatment, or produce irreversible changes in the skin. These make difficult any attempt to evaluate the results of treatment based on skin tests or any other method. The skin test makes possible the avoidance of the irritating allergic factors, but the eczema will not clear until complicating factors are recognized and properly treated. Nevertheless, in eighty-six cases chosen for their refractoriness prior to skin testing, fifty-eight cases, or 65 per cent, obtained a good result; eighteen cases, or 21 per cent, obtained a fair result; and ten cases, or 12 per cent, were not helped.

CONCLUSION

In conclusion, if the diagnosis is correct, if the skin testing is properly done and its limitations ap-

preciated, if the results of the tests are intelligently, diligently and patiently applied, if the course of the symptoms is carefully watched and preconceived ideas avoided, the protein skin tests are a highly efficient method for the diagnosis and control of allergic eczema.

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CHRONIC GALL-BLADDER DISEASE*

PREPARATION OF THE "BAD RISK" PATIENT

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BEFORE discussing the preparation of a "bad risk" patient, we must have some understanding of the meaning of the term. The patient believed by one surgeon to be a poor operative risk may not be so considered by another with more experience and sounder surgical judgment. This situation is not serious, but a reversal of the two viewpoints might easily prove tragic. As a rule the "bad risk" patient may be said to be one whose general condition or some specific additional disease makes surgery especially hazardous.

All of us would agree that certain patients are bad risks—for example, the elderly patient with a poor cardiac reserve. Although age alone does not necessarily constitute a bad risk, its combination with heart disease may prove so serious that surgery is not warranted. In fact, any patient of any age with definite myocardial damage and decompensation is a poor risk. The obese patient, too, regardless of age or cardiac output, is a poor, perhaps even a bad risk. These patients should be made to reduce in weight before surgery is attempted. Also to be considered in this category are patients with renal or cardiorenal disease, diabetes, secondary anemia, hyperthyroidism, jaundice, pulmonary disease, and those who for any reason are losing weight. In addition, we have heard, and shall hear more, from those here this morning about the deficiency of the liver which constitutes a bad risk not only in surgery of the gall-bladder, but in any other major surgery.

EVALUATION OF SURGICAL RISK

It seems evident from the foregoing that, in order to evaluate the surgical patient properly, a careful history must be taken and an extensive physical examination, as well as certain indicated laboratory studies, must be done before surgery is contemplated, unless the surgical lesion is such an emergency that the other aspects of the case must be discounted. Chronic disease of the gall-bladder seldom, if ever, constitutes an emergency. The preoperative preparation of the patient for surgery of the gall-bladder, as for any other major surgery, is just as important as the technical procedure itself; sometimes it is more important. Time for the proper preparation of the patient is, in my opinion, the greatest element in successful surgery of the gall-bladder. It is impossible, however, to outline detailed plans for preparation before operation which would be applicable in every case. No two cases are alike and each must be evaluated so that the correct treatment can be instituted for each patient.

It is in handling of bad risks that the teamwork between the internist and surgeon comes into play. If a patient has cardiac damage and associated disease of the gall-bladder, for example, there is no reason why he must go through life suffering from the troublesome gall-bladder. That such cases are far from uncommon is indicated in a recent article by Breyfogle,[1] who reported that disease of the gall-bladder is definitely associated with diseases of the arteries and muscles of the heart, and contributes to death from the latter ailment. He analyzed 1493 consecutive autopsy records and found 162 cases in which the primary cause of death was considered to be heart disease; in seventy-nine of these, disease of the gall-bladder also was found. In addition, he reported the association of heart disease in 20 per cent of 363 cases of disease of the gall-bladder, which he studied. Recently two patients, who had had known heart disease for a good many years, were operated on here for disease of the gall-bladder. The attacks of cholecystitis had become so frequent that their lives were miserable. These patients insisted that something be done, each saying that he preferred to die from the effects of the operation rather than to continue to live in such discomfort. Each was prepared for operation, with the close coöperation of an internist, by a similar régime—rest in bed, digitalis, and a high caloric, high vitamin diet with fortified fruit juices in order to store up an extra amount of glycogen in the liver. After two weeks of such preparation, cholecystectomy was performed without particular difficulty. These patients were operated upon under ether anesthesia and with the use of a straight transverse incision. This is a technical point well worth considering for patients in whom some pulmonary or cardiac difficulty may be anticipated following surgery. Pain in such an incision is much less than in the rectus incision. Because of this there is not the splinting of the upper abdomen and lessening of the excursion of the lung. In other words, the patient can breathe normally and aerate the lungs without pain.

OTHER EXAMPLES

The patient with chronic disease of the gall-bladder, as well as severe impairment of renal function, has a very serious handicap. Surgery must be postponed until renal function becomes as nearly normal as possible. Rest, diet, and fluids may, after a week or two, greatly improve the function of the kidneys. If there is any obstruction to the urinary outflow it must be corrected before operation upon the gall-bladder is undertaken. Urologists have taught us much about renal deficiencies in their work of preparing aged patients for urologic operations.

The combination of myocardial damage and renal insufficiency in connection with disease of the gall-bladder constitutes a dangerous situation requiring the most careful evaluation to determine whether the patient should ever be subjected to surgery

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